

BRE Global Test Report

BS EN ISO 1716 Gross heat of combustion (calorific value) test on the PVDF Paint, the PVDF coating of Futural

Prepared for: Anhui HJ Tech Co., Ltd.

Date: 24 February 2023

Report Number: P122325-1000 Issue 3

BRE Global Ltd
Watford, Herts
WD25 9XX

Customer Services 0333 321 8811

From outside the UK:
T + 44 (0) 1923 664000
F + 44 (0) 1923 664010
E enquiries@bre.co.uk
www.bre.co.uk

Prepared for:

Anhui HJ Tech Co., Ltd.
#568 South Huizhou Rd.
Chuzhou City
Anhui Province
China



0578



Prepared by

Name C A Rock

Position Principal Consultant

Signature

A handwritten signature in blue ink that reads "CA Rock".

Authorised by

Name J Hunter

Position Section Leader, Reaction to Fire

Date 24 February 2023

Signature

A handwritten signature in black ink that reads "J Hunter".

This report is made on behalf of BRE Global and may only be distributed in its entirety, without amendment, and with attribution to BRE Global Ltd to the extent permitted by the terms and conditions of the contract. Test results relate only to the specimens tested. BRE Global has no responsibility for the design, materials, workmanship or performance of the product or specimens tested. This report does not constitute an approval, certification or endorsement of the product tested and no such claims should be made on websites, marketing materials, etc. Any reference to the results contained in this report should be accompanied by a copy of the full report, or a link to a copy of the full report.

BRE Global's liability in respect of this report and reliance thereupon shall be as per the terms and conditions of contract with the client and BRE Global shall have no liability to third parties to the extent permitted in law.

Opinions and interpretations expressed herein are outside the scope of UKAS Accreditation.



Table of Contents

1	Objective	4
2	Sample	4
2.1	Traceability	4
2.2	Description of sample and test format	4
3	Conditioning	5
4	Results	6
4.1	Tabulated data	6
4.2	Validation of test results	6
4.3	Observations	6
5	Conclusions	7
6	Validity	7
7	Reference	7
Appendix A	Sample description	8
	Table A.1: Test sponsor's product description of Futural aluminium cladding panel	8
	Figure A.1: Test sample as received	11



1 Objective

The requirement of the work was to assess the performance of the sample described in Section 2 of this report when subjected to the tests specified in BS EN ISO 1716¹.

2 Sample

2.1 Traceability

The test sample was supplied by the test sponsor. BRE Global was not involved in the sample selection process and therefore cannot comment upon the relationship between the sample supplied for test and the product supplied to market. The test specimen was prepared by a representative of BRE Global. The results apply to the sample as received.

2.2 Description of sample and test format

Unless otherwise stated all measurements are nominal.

Parameter	Details
Test sponsor	Anhui HJ Tech Co., Ltd. c/o Pro Composite Solutions Ltd. 50 Cowick Street Exeter EX4 1AP United Kingdom
Prepared for	Anhui HJ Tech Co., Ltd. #568 South Huizhou Rd. Chuzhou City Anhui Province China
Manufacturer of coating under test	Note 1
Manufacturer of coated aluminium cladding panel	Anhui HJ Tech Co. Ltd. 568# South Huizhou Rd. Chuzhou City Anhui Province China
Place of manufacture	Note 2
Trade name (as provided by test sponsor)	PVDF Paint (Tradename: Note 1)
Sample reference	PVDF Paint
Sample description (as provided by test sponsor)	PVDF coating of an aluminium cladding panel. The test sponsor's product description for Futural, the coated aluminium cladding panel, coated with the PVDF coating under test, is shown in Appendix A of this report.
Description of sample (as received)	Large dark grey flakes of cured coating as shown in Appendix A of this report



Parameter	Details
Test sponsor's product data	
Generic type of product	Polyvinylidene fluoride or polyvinylidene difluoride (PVDF) coating
Nominal thickness (μm)	38 ± 8
Nominal mass per unit area (kg/m^2)	0.038
Nominal density (kg/m^3)	Note 1
Colour	Dark grey
Flame retardant treatment added, or organic content limited during production	No. Note: The sample is a thermoplastic fluoropolymer.
European product standard, if applicable, based on the trade name supplied by the test sponsor	Note 1
Measured sample data, determined by BRE Global @ 23 °C \pm 2 °C and 50 % \pm 5 % RH	
Mean sample density (kg/m^3)	Not measured
Mean sample thickness (mm)	Not measured
Mean sample mass per unit area (kg/m^2)	Not measured
Test information	
Orientation aspects	Not applicable
Test sponsor's sampling identification	PCS1
BRE Global sample number	E14244
Sample receipt date	18 May 2022
Date into conditioning	18 May 2022
Date of test	27 June 2022
Additional information	The test sponsor stated that PVDF Paint was the PVDF coating of Futural.

Note 1: This commercially sensitive information has been withheld from the test report at the request of the test sponsor and is held in confidence in the BRE laboratory file.

Note 1: This information was not supplied by the test sponsor.

3 Conditioning

The test specimens were conditioned as required by the test standard.



4 Results

4.1 Tabulated data

Table 1: Gross heat of combustion (Q_{PCS})

Method: Crucible Combustion aid: Paraffin oil Operator: C A Rock

Number of test runs: Three Mass ratio (sample: combustion aid): 1:1

Deviations: There were no deviations from the test standard

Parameter	Data			Calculated data
	1	2	3	
Run Number	1	2	3	
Calorimeter code	E14244-01	E14244-02	E14244-03	-
Q_{PCS} , MJ/kg	14.5902	14.4812	14.5245	-
Data used to calculate Q_{PCS} , MJ/kg	14.5902	14.4812	14.5245	-
Mean Q_{PCS} value, MJ/kg				14.5320
Mean Q_{PCS} value, MJ/m ² @ 0.038 kg/m ²				0.5522
Maximum Q_{PCS} value - minimum Q_{PCS} value of the 3 replicate tests, MJ/kg				0.1090
Maximum Q_{PCS} value - minimum Q_{PCS} value of the 3 replicate tests, expressed as a percentage of the mean Q_{PCS} value, %				0.75

4.2 Validation of test results

To be validated, the test results shall comply with the criteria specified in Clause 11 of the standard. The following criteria apply.

Gross heat of combustion	Max-min of the 3 replicated tests	Range of validity
Q_{PCS} (MJ/kg)	≤ 0.2 MJ/kg	Up to 3.2 MJ/kg
	Within 5 %	From 3.2 MJ/kg to 20.0 MJ/kg
	Within 10 %	Greater than 20.0 MJ/kg
Q_{PCS} (MJ/m ²)	≤ 0.1 MJ/m ²	Up to 4.1 MJ/m ²
	Within 5 %	From 4.1 MJ/m ² to 20.0 MJ/m ²
	Within 10 %	Greater than 20.0 MJ/m ²

4.3 Observations

The organic components present within the test specimens fully combusted, leaving no residue in the bottom of the crucible.



5 Conclusions

A sample as described in this report, when tested in accordance with BS EN ISO 1716¹, achieved a gross heat of combustion (Q_{PCS}) of 14.53 MJ/kg.

BS EN ISO 1716¹ does not contain acceptance criteria and therefore this test report does not indicate a pass or fail of the product

6 Validity

This report is Issue 3 of BRE report P122325-1000. At the request of the test sponsor, commercially sensitive information relating to the tradename and manufacturer of the sample and the physical characteristics of the pre-coated aluminium product listed in the test sponsor's product description have been withdrawn from this report. At the request of the test sponsor, the nominal thickness of the coating has been changed from 35 μm to 38 $\mu\text{m} \pm 8 \mu\text{m}$. BRE report P122325-1000 Issue 2, dated 15 November 2022 has been withdrawn with effect from the date of this report.

BRE report P122325-1000 Issue 2 was published on 15 November 2022. At the request of the test sponsor, a correction had been made to the name and address of the company for whom the report had been prepared. BRE report P122325-1000 Issue 1, dated 02 August 2022 was withdrawn with effect from the date of the Issue 2 report.

The differences between the maximum and minimum Q_{PCS} values were within the range of validity specified in Clause 11 of the test standard.

These test results relate to the behaviour of the sample in the form in which it was tested; the results do not necessarily relate to products produced as a result of further processing or refinement of the sample under test.

The test results relate to the behaviour of the test specimens of a product under the particular conditions of the test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.

The information in section 2.2 and in Appendix A of this report, other than that indicated otherwise, was supplied by the test sponsor, and was not independently verified by BRE Global. The validity of the results is conditional on the accuracy of that data.

Because of the nature of reaction to fire testing and the consequent difficulty in quantifying the uncertainty of measurement of reaction to fire, it is not possible to provide a stated degree of accuracy of the results.

7 Reference

1. BS EN ISO 1716: 2018. Reaction to fire tests for products - Determination of the gross heat of combustion (calorific value). BSI, London. 2018.



Appendix A Sample description

Table A.1: Test sponsor's product description of Futural aluminium cladding panel

Test sponsor Company Name: Anhui HJ Tech Co., Ltd. Address: #568 South Huizhou Rd. Chuzhou City Anhui Province China Postcode: 239065	
Parameter	Details (if applicable)
Trade name of product	'Futural' or 'HJ TECH PVDF Pre-coated Solid Aluminium'
General description of product	PVDF pre-coated aluminium
Name and address of manufacturer of product	Anhui HJ Tech Co., Ltd. #568 South Huizhou Rd. Chuzhou City Anhui Province China
Place of manufacture	China
Product reference/number	'Futural' or 'HJ TECH PVDF Pre-coated Solid Aluminium'
Thickness	≤ 3 mm (Nominal 3 mm)
Density	2.7 g/cm ³
Mass per unit area	≤ 8.1 kg/m ² (Nominal 8.1)
Generic type of product	PVDF Pre-coated aluminium
Flame retardant treatment added, or organic content limited during production (yes/no), if yes give details	No
Harmonised EN product standard, and AVCP System No. if applicable	EN13501-1
Industry/in-house product standard, if applicable	Note 1
Interior facing 1 Coating	<ul style="list-style-type: none"> - Generic type - Product reference - Manufacturer - Thickness - Mass per unit area/density - Colour reference - Trade name flame retardant - Generic type flame retardant - Amount flame retardant
Interior facing 2	<ul style="list-style-type: none"> - Generic type - Product reference - Manufacturer - Thickness - Mass per unit area/density - Colour reference - Trade name flame retardant - Generic type flame retardant - Amount flame retardant